

XXV. *The Surface Breeding Petrels of the Kermadec Group.*

By TOM IREDALE, M.B.O.U.

(Plate XV.)

SYSTEMATIC workers have long considered these birds a fair theme for discussion, and the present paper was prepared some time ago as an attempt to dispose of theoretical propositions by means of practical experience.

I have summarised my conclusions in two Antipodean journals, but these do not commonly fall under the eye of British ornithologists, who in many cases have not only difficulty of access to such, but have not the inclination to study the work of Antipodean strugglers. For, deprived of much literature and served with scant material, Antipodean students make a brilliant show when their work comes to be compared with that of their more favoured and better situated brother scientific workers on this side of the globe.

So many of my friends are still ignorant of the position of the Kermadecs, that I consider it necessary to once more outline the position and extent of these Islands.

The main and only habitable island, known as Sunday Island (or Raoul Island), is situated on the 180th meridian of longitude and about 28° South latitude. That is, it is the furthest point east or west of Greenwich it is possible to get. The reason for this statement will be shown later on.

The island is simply the rim of a volcanic crater, which varies in height from 200 feet to 1700 feet, averaging over 1000 feet. Its area is upwards of 7000 acres, and it is densely bush-clad and a mass of gullies and ravines. Three quarters of a mile distant from the north-east corner lies a group of islets of which the chief is Meyer Island. This is a double-humped rocky isle, only about forty acres in extent and rising about 400 feet. It is quite necessary to detail the location of Meyer Island, as this islet enters largely into the history of these petrels, and inaccurate statements have been circulated concerning it by authors devoid of local knowledge.

John Macgillivray was the first naturalist to make reference to these birds, and though his collection was made on Meyer Island, the birds were labelled Raoul Island. The reasons were that the former islet was unnamed, the name being given by Macgillivray's companions, and no suggestion of complications could have occurred to him as he only met with birds on that islet.

Before proceeding further it had better be stated that we have here an extraordinary case of similar or identical birds breeding at different times of the year on closely adjoining areas without any observed differentiation.

Thus, from August to May, Sunday Island was frequented by birds: the number was estimated very roughly at about half a million individuals. Meyer Island was not at first occupied by such Petrels, but about January a colony came and settled, and laying eggs in the end of February and March, their young took to flight in August. A rough calculation gave about six thousand pairs. Two noticeable features of the Meyer Island colony may be glanced at. Owing to the small size of the island, the birds were much more crowded, and consequently, available space being limited, they came to earth more regularly, and the length of the breeding season was shortened. Thus whilst on Sunday Island the first birds were observed in the last days of July, and their numbers increased during August, no eggs were laid until the middle of October. The latest bird seen sitting on an unhatched egg was on February 9; the first young absolutely ready for flight was observed on the last day of March, and all the young had flown before the end of May. This gives a period of ten months during which these birds were about the Island, whilst it would show a period of about five months from the date of laying until the young bird flies.

Now this same time must be occupied by the birds on Meyer Island, but here observations were limited owing to the impracticability of landing on the islet by reason of the weather. However, on February 29, that island was crowded with settled birds, and about one in every five birds seen was sitting on its egg. Towards the end of April every bird had

either an egg or a chick, though many eggs were freshly laid. At the end of May all the eggs were hatched and many big downy young were observed. At the beginning of August almost all the young birds had flown. By the middle of November there were no signs of these birds about Meyer Island. Four months would here seem to elapse between the date of laying and the flight of the young, and we were unable to make a satisfactory explanation of this at that time.

To revert now to my previous paragraph, I would explain that in addition to this erratic breeding performance on the part of these Petrels, a great variation in the coloration of the birds has been observed. The variation was first mentioned by John Macgillivray, and from a note in the 'Zoologist,' 1860, p. 7134, it is gleaned that he was inclined to the view that the difference in coloration was due to immaturity, though all the birds were breeding. Salvin discussed this variation when he obtained examples of *Estrelata arminjoniana* from South Trinidad Island, Atlantic Ocean, and at first considered the differences specific, though he afterwards retracted that view.

From Macgillivray's time until 1887 no one appears to have visited Sunday Island save Dr. Graeffe, who in the interests of the Godeffroy Museum, made collections there. Little interest, however, seems to have been evinced by him in these birds.

In 1887 the Group was annexed to New Zealand, and the Government vessel sent there, carried Mr. T. F. Cheeseman, of the Auckland Museum. Though more interested in Botany, he made numerous notes on the bird-life of the group, and obtained the assistance of the settlers on the island in furthering his investigations into the Petrels there. The extraordinary tales which accompanied the receipt of specimens by Buller and Hutton, through Cheeseman's intervention, produced some remarkable results. It is necessary to review these results, as it was due to the confliction of the very diverse accounts that an attempt was made to produce reconciliation.

Cheeseman's first account gives three species as surface breeders :—

Æstrelata mollis Gld., on Buller's identification, was the name of the " Mutton Bird " which bred during the summer (October to May) on Sunday Island.

Æstrelata sp. was used for the Meyer Island winter-breeding (March to August) bird. Cheeseman observed that these birds seemed to him inseparable from the Sunday Island bird.

Æstrelata neglecta Schl.? was included as being on record from the Kermadecs, and because he had notes which might refer to this species.

Buller about the same time drew attention to the fact that this Petrel was dimorphic in coloration, both dark-coloured and light-coloured birds occurring and breeding together. He, however, used for the bird the incorrect name *Æstrelata mollis* Gould.

Hutton then, having received a collection of Petrels from Cheeseman, contributed to the Proceedings of the Zoological Society of London, 1893, a paper theorising as to the observed variation. That paper is somewhat misleading as the labelling of the birds was incompletely and inaccurately done, and misled by these labels and furnished with paltry data, incorrect deductions were arrived at.

Therein three species and one variety were maintained. Thus on p. 752 *Æstrelata leucophrys* was proposed as a new species for a very light white-headed form from Sunday Island.

Æstrelata neglecta Schlegel, p. 752, was given as the correct name for the bird identified by Buller as *Æ. mollis* Gould. Though the birds were labelled Sunday Island, Hutton states that Cheeseman informed him that this was the winter Mutton Bird of Meyer Island. Included also was a nestling labelled " Sunday Island, Nov. 1890." The description shows that either the labelling was done when the steamer lay at anchor at Sunday Island, or else when the birds arrived at Auckland. For no such bird could have

been procured either on Sunday Island or on Meyer Island in the month of November.

Æstrelata neglecta variety, p. 754, is used for a specimen, which Hutton decided must be the Summer Mutton Bird breeding on Sunday Island. Further, on p. 755, *Æstrelata phillipi* Gray was used for a uniformly coloured dark bird which Hutton considered distinct, though all the birds were sent together with no differential notes by the collector on the Island.

The suggestions made by Hutton to account for the variation I will deal with at the end of this paper. Buller at once declared that *Æ. leucophrys* Hutton was only a form of *Æ. neglecta* Schlegel, which he accepted as the correct name of the species; while he stated that he had proposed to describe the very dark birds Hutton called *Æ. phillipi* Gray, but that Salvin had dissuaded him; Salvin's view being that the very light as well as the uniform dark birds were only colour variations of one very variable species.

Not satisfied, Hutton endeavoured to obtain information regarding the habits of these birds. In a letter to Buller (Oct. 7, 1902), he communicated his results.

White Titi (*Æ. neglecta*) commences to breed early in November; inland, on ridges: young covered with white down.

Black Titi (*Æ. phillipi*) commences to breed late in November; on the coast, on the edges of cliffs: young covered with greyish down.

Hutton had no further information concerning *Æ. leucophrys*, but assumed that it might have different habits and hence should be treated as a variety or incipient species. Later he contended that the Winter Mutton Birds were *Æ. leucophrys* Hutton.

Buller in his Supplement, notwithstanding his apparent acceptance of Hutton's views, included three species as surface-breeding at the Kermadecs:—*Æ. mollis* Gould, *Æ. neglecta* Schlegel, and *Æ. phillipi* Gray. The first is included though no new evidence is produced in its favour,

and though Buller himself had accepted Hutton's correction of his error; to the second *Æ. leucophrys* is ranked as a synonym, and under the species name Hutton's diverse opinions are quoted without comment: whilst the last-named is included on Hutton's proposition of it in 1893, though Buller then opposed it and Hutton had since withdrawn his idea of the specific distinction of the form, and Buller had printed that retraction.

Such was the state of our knowledge of these Petrels in 1907, when an Expedition was organised in New Zealand to investigate the Biology and Geology of the Group. As the Kermadecs are completely isolated, being 600 miles from the nearest land-point and communication is effected only once a year, it was necessary to provide for such a long stay. The length of time was considered peculiarly adapted to the solution of the problems surrounding these birds. As a matter of fact, ten months only were spent on the island, and consequently some of the more interesting results as to breeding habits were not fully realised.

I landed on Sunday Island (Plate XV.) on the 31st of December, 1907, and left on the 10th of November, 1908.

Upon my arrival at the island, the first attraction was the multitude of birds encircling the tops of the trees in every direction. As night fell the noise increased, though it was not so noticeable on the beach owing to the clamour of the Wideawakes (*Onychoprion fuscatus serratus* Wagler). The first evening a tent was struck almost upon the open beach, and just after dark a Mutton Bird made a plaintive appeal against our intrusion. At sunrise next morning it was discovered sitting on its egg within six feet of the tent entrance. Curiously enough, it was a uniform dark bird (*Æ. phillipi* Hutton), which according to theory should not have been there. A few days later a tour was made of the island and copious notes were taken. Though many had hatched young, the majority were sitting on eggs; they were observed on the ground in every situation *but none* in burrows. The bulk had to be content with the shelter of the fern alone, though every shelter was taken possession of. Many were



1. GENERAL VIEW OF SUNDAY ISLAND.



2. MEYER ISLAND SEEN FROM SUNDAY ISLAND.

right out in the open, and in some rare instances exposed to the sun. The birds were very gentle and allowed themselves to be handled without protest, whereas the large downy young strongly objected. While camping out in the bush, the non-sitting birds were observed to come flying in at sunset, and before settling, to circle about a single spot, calling all the time as if to let their mates know that they were coming. Soon after dark all became quiet, save now and then one broke the silence as if enquiring for its mate. Early in the morning, just before sunrise, the birds which had not to sit would leave again for the day.

The result of our investigations was the rejection of every theory of incipient species, or varieties, in connection with the Sunday Island bird. Every degree of coloration was met with in every location, and there seemed no means of distinguishing any forms. Hutton's information proved to have been unreliable, as there were no inland ridges which could be differentiated from coastal cliffs: both terms were inaccurate and misleading. There was a variation in the colour of the down from pure white to dark grey, but it was not constant and could not be utilised to separate any forms. For the next three months every bird that gave any indication of abnormality was handled and examined. In conversation, I have stated that I had handled thousands of these birds, and I have been scoffed at, yet it is absolutely the truth.

The fully grown immature birds form the staple diet of the islanders, and we had to depend upon them for our meat supply. They were collected in the first three weeks of April, and between 2000 and 3000 were preserved. When these were being collected, I paid special attention to the matter of variation, and the numbers taken were recorded. A not uncommon occurrence was the finding of abnormal specimens due to improper feeding. In many cases two birds sitting close together would become antagonistic, and one mother bird would drive the other one away at every opportunity, so that the young of the latter would obtain just sufficient food to keep it alive and be noticeably reduced in every

way. These starvelings were dwarfed structurally, and I cannot think that they would ever reach the normal size. It is possible that their systems would be so weakened that they could not survive the first winter's struggle at sea. In other cases it was noted that specimens seemed to have developed strongly and were bigger birds. Indeed, the bills of some of these young giants recalled those of *Pterodroma macroptera gouldi* (Hutton).

I was now convinced that it was impossible to indicate any incipient species on the main island, but realising the doubting view of the systematic ornithologist, I resolved to attempt to make assurance doubly sure.

In the spring, just after the birds had settled, I devoted three days to a tour of the island with the sole object of getting reliable data with regard to the variation. Mr. Sidney Oliver accompanied me, and we walked right round the island. The route extended some miles, and every altitude was included, rising from the flat to 1200 feet and falling again to sea-level: then, following the crater rim, it rose to 1700 feet, the highest point of the island, and then descended to the commencing place. So that no prejudice should enter into this examination, *every* bird adjacent to the track was handled, the coloration of the head, breast, belly, and legs written down. It should be noted that the word track as here used does not mean a beaten road, but simply a direction through a virgin bush. Throughout the journey every little variation was carefully noted, but nothing was found whereby forms could be separated.

On the other hand, the observed variation was found to be so great that we could not definitely match two birds. The darkest birds were almost black above and below, with uniformly black legs and feet; the next stage would be dark blackish-grey birds with dark legs and feet: *many dark birds would have "sandalled" or "light legs"* (the reason for these italics will be shown later on): then there would be dark birds, with the belly white or nearly so: these and all the light forms had generally "light legs," but *some light birds were found with uniform dark legs and feet.* Birds in which

the grey of the head and neck was mixed with white, but still with greyish throats, were common, but the birds in which the grey had almost vanished were infrequent. Every combination of coloration was noted and, at whatever elevation the birds were found the variation was the same. Sometimes the lightest birds would seem to be the most numerous, but then a number of dark ones would turn up. When sitting, the length of the wings was noticeably variable: in some birds the folded wings would extend beyond the tail, whilst in others they would not reach to the end of the tail. But upon measurement the wings of the birds were seen to be of the same length. This is noted, as Hutton used this character as seen in dried skins to separate some of his forms.

I have used, to designate the coloration of these birds, the comparatives light and dark only: owing to the wonderful range of coloration it was difficult to assign many of these birds to even these main divisions. The dark birds varied among themselves quite as much as the light ones: two very dark birds have been noted sitting together, when the contrast of colours was clearly observed. The general appearance of the newly settled birds was such that black and grey would be used to describe them, but brown was also commonly present. At the end of the breeding season russet was abundant in the old birds, the young showing more black and grey: this suggested that the brown birds would moult black or grey, but probably all do not. A newly settled bird was seen on October 18 whose scheme of coloration was decidedly reddish brown. The head and breast were light grey with a delightful russet sheen, which was vivid on the brown back and wings. Later, other newly settled birds with a reddish-brown scheme were not unusual.

The tabulation of the observations made on the three days' tour give the following results:—

Birds examined	264
Light head and throat, white belly, light legs . .	52
Dark head and throat, white belly, light legs . .	64
Dark head and throat, dark belly, light legs . .	23
Dark head and throat, dark belly, dark legs . . .	41

Black head and throat, black belly, black legs . .	30
Very light head, lighter throat, white belly, light legs	44
Light head and throat, white belly, dark legs . .	5
Black head and throat, black belly, light legs . .	4
Pure white head, throat and belly, light legs . .	1

A consideration of these would make the birds fall into three classes—dark, light, and medium; moreover, 102 would be called light, 98 dark, and 64 medium. That is practically 40 per cent. are dark, 40 per cent. light, and 20 per cent. medium. Such figures seem to prove that no differentiation can be made in view of these results.

Included in the 264 birds were 35 pairs; these last consisted of two birds nesting together and obviously mated; in sixteen cases odd birds were seen together, and in nineteen cases similar birds were coupled. In only two cases were a very light bird and a very dark one paired, and in no case were two very light birds observed mated, and in only one case were two black birds together. Such results again confirm the impossibility of suggesting incipient forms as recognisable.

Hutton gave different times for the beginning of the breeding season. The first eggs were carefully noted and the coloration of the sitting bird taken. Out of the first eighteen met with all over the island four were dark, four were light, and ten were medium.

Whilst making these notes, careful attention was given to locality, but though a few individuals together seemed to show a similar style of coloration, such patches were of little extent and rare occurrence.

I can only conclude that on Sunday Island the birds, whatever their coloration or habits, belong to one species. There were no varieties or incipient species that could be differentiated by dissimilar habits or nesting places.

The Meyer Islands (Plate XV. fig. 2), through stress of weather, could not be examined so thoroughly as Sunday Island, but the birds there were subjected to a severe criticism and variation was found to be rampant. At first

less variation than had been observed on Sunday Island was suggested, but this I believe was due to the smaller number of birds examined. Every style and combination of coloration was noted, but the extremes were much rarer. I could find no detail whereby the Meyer Island birds could be separated from those of Sunday Island. It may be recorded that previously every investigator, Hutton, Buller, and Salvin, had all failed, from examination of skins, to indicate any separable characters. *I am therefore compelled, for the present, to refer to the Meyer Island breeding bird as a variety of *Œstrelata neglecta* Schlegel.*

These conclusions had been anticipated by Godman in the 'Monograph of the Petrels,' which, published whilst I was upon the Kermadecs, included all the forms Hutton and Buller had separated under the species name *Œstrelata neglecta* Schlegel. That this was due more to chance than anything else is shown by the synonymy utilised and the vernacular name chosen. Thus, *Procellaria phillipii* Gray is given as a synonym, though anterior to Schlegel's *neglecta*, whilst the vernacular name used is Phillip's Fulmar. As a matter of fact, *P. phillipii* Gray has nothing to do with this species, and the name Phillip's Fulmar must be rejected. Hartert, Jourdain, Ticehurst, and Witherby in their 'Handlist of British Birds,' 1912, p. 154, use the vernacular Schlegel's Petrel, whilst a footnote reads "The name *Procellaria phillipii* Gray, 'Ibis,' 1862, p. 246, based on the plate in Phillip, *Voyage to Botany Bay*, must remain doubtful until we know which kind of *Pterodroma* breeds on Phillip Island. As this name is not accepted, the English name 'Phillip's Fulmar,' used by Godman (*Mon. Petrels*, p. 226), cannot be recommended.—E. H."

However, the use of Schlegel's Petrel should not be maintained, as in the 'Monograph of Petrels' that name was made use of in connection with the *Œstrelata incerta* Schlegel. I had shown the true value of *P. phillipii* Gray in connection with this bird in the Proc. Linn. Soc. N.S.W. vol. xxxv. 1911, p. 780, and Mathews has completed the task by accurately determining that species (*Birds Austr.*

vol. ii. 1912, p. 141 *et seq.*). Phillip Island, in the note by Dr. Hartert above quoted, is simply a penslip for Norfolk Island.

Mathews and I ('Ibis,' 1913, p. 232) used as the English name "Kermadec Islands' Petrel," and this is certainly preferable to the twice-used "Schlegel's Petrel."

In the 'Hand-list of British Birds,' as above noted, *Pterodroma neglecta* is admitted to the British List upon the strength of an occurrence of a bird found dead near Tarporley, Cheshire, April 1, 1908. Upon the same page *Pterodroma brevipes* Peale is also included, as a bird so identified was shot near Aberystwyth, Wales, in November or December 1889.

Neither of these two birds should figure in the British List as genuine wanderers to these shores. The first-named, at my suggestion, has been re-examined and declared to be an authentic Kermadec specimen by Mr. W. R. Ogilvie-Grant of the British Museum. Though my own acquaintanceship with the Kermadec species is, as I have shown above, probably better than Mr. Grant's, I bow to his superior knowledge in the handling of bird-skins, and would therefore point out that it would be best, even if it be a Kermadec bird, to enter it in a footnote. Upon p. 155 of the 'Hand-list' Messrs. Hartert, Jourdain, Ticehurst, and Witherby write regarding *Daption capense*, which they do not admit to be a British Bird:—"Examples of this species, an inhabitant of the southern seas, have been recorded from the Dovey 1879, near Dublin 1881, and near Bournemouth in 1894, but former writers have excluded them as not being genuine wanderers with some reason."

The extraordinary illogical argument that would admit *Œstrekata neglecta* Schlegel to the British List and reject *Daption capense* Linné I cannot uphold. The former has not yet been recorded from Australia or New Zealand, yet it can arrive exactly half-way round the world in order to be admitted to the British List. Whilst, though *Daption capense* Linné has only to fly up the Atlantic Ocean, it must be rejected as unable to do so. Yet the powers of flight in the two species are exactly the converse, the *Daption* being

a powerful seagoing bird, whilst the *Æstrelata* is hardly a wanderer at all.

The bird identified as *Pterodroma brevipes* Peale is now in the British Museum, and does not belong to that species.

I have stated that Godman's acceptance of all the Kermadec forms as referable to one species, did not seem due to skilful judgment, as in the same place two species are admitted from South Trinidad Island, viz. *Æ. arminjoniana* Giglioli & Salvadori and *Æ. trinitatis* ibid. The only difference between these two species is that the latter is a uniform dark bird with wholly black legs, whilst the former is a variable coloured bird with sandalled legs. I have shown this character (of the coloration of the legs) to be absolutely valueless in connection with the Kermadec birds, and my examination of South Trinidad birds confirms me in the same conclusion.

As a matter of fact, the only differences apparent between the South Trinidad birds and the Kermadec ones, is that the former have slightly shorter toes and the latter have white shafts to the primaries, whilst the South Trinidad birds have dusky shafts. I might note that immature Kermadec birds have also dusky shafts. Mr. Grant lays great stress upon the latter character to decide the identity of the British specimen. I think that further investigation will show that white-shafted birds occur in the Atlantic. The British specimen is set up, but it certainly seems to me to have the short toes of the South Trinidad form.

Under the circumstances I think I am perfectly justified in advising the non-inclusion of *Æstrelata neglecta* in the British List.

Before leaving the subject I would draw attention to Hutton's proposed solutions to the problem of the variation of this species:—

- (a) Two distinct species, sometimes producing hybrids.
- (b) One excessively variable species, one form producing, or partially producing, in an irregular way, the other.
- (c) Two species developed by ordinary variation going on for a long time, while the intermediate forms have not become extinct.

Hutton suggested that the last-named might be the best solution, but my experience leads me to select the second, and this would also account for the non-differentiation of the Meyer Island form. A species subject to much variation is less likely to show a fixed difference through slight isolation in a short time.

It is regrettable at the present time to see the ignorance of this group displayed by many writers who pretend to knowledge which they do not possess. Many of the statements made by Pycraft in his various works are inaccurate and misleading, as, written in a general manner, they have been adopted from special cases. In the 'Monograph of Petrels' an article "On the Systematic Position of the Petrels" includes the following sentence: "The young when hatched are blind." I have never seen a blind nestling of *Estrelata* or *Puffinus*, though I have seen them emerging from the egg.

XXVI.—*On Sterna fuscata Linné.*

By TOM IREDALE, M.B.O.U.

(Plate XVI.)

THE beach at Sunday Island, in the Kermadec Group, when I landed was covered with breeding Wideawake Terns. As the season was well advanced half-grown young were plentiful, and the contrast between these dusky birds and their beautiful clean, boldly marked black and white parents, was a sight to remember. For weeks the work of camp building and luggage carrying made it necessary to pass amongst them many times daily. This dreary work done, much time was spent in photographing them and studying their habits.

Had I the pen of a Howard or Selous, pages might have been written and much interesting life-history related. As it is I cannot recount the curious antics which these birds indulged in, but I offer an illustration of a peculiar attitude